Waquoit Bay
National Estuarine
Research Reserve

BRINGING WETLANDS TO MARKET

Project scientists will measure greenhouse gas fluxes from wetlands using a flux chamber coupled to automated field gas analyzers. New, laser-based, spectrometers will enable the team to take the number of measurements necessary to capture changes in gas flux rates across different locations, times of day, and seasons.

Stay in touch

The NERRS Science Collaborative is committed to sharing information about the projects we fund in the most effective way we can. Updates about this project will be communicated through webinars, meetings, conferences, and nerrs.noaa.gov. If you would like to stay in touch with this project, contact our program coordinator, Cindy Tufts: cindy.tufts@unh.edu.

For questions about the applied science aspect of this project, contact Alison Leschen, NERR manager: 508-457-0495, ext 103; alison.leschen@state.ma.us

For questions about the collaborative process, contact Tonna-Marie Surgeon-Rogers, NERR Coastal Training Program coordinator: 508-457-0495, ext. 110; Tonna-Marie.Surgeon-Rogers@MassMail.State.MA.US

What's happening?

A project led by the Waquoit Bay National Estuarine Research Reserve (WBNERR) has received a $1.3 million grant to generate science and management tools with the potential to bring coastal wetlands into international carbon markets and incentivize investment in tidal wetland restoration and preservation.

This three-year project will examine the relationship between salt marshes, climate change, and nitrogen pollution. Through a blend of targeted science, modeling, and broad stakeholder input, the team aims to generate information and tools that coastal decision makers can use to manage nitrogen pollution, design effective wetlands protection and restoration projects, and create policy frameworks and economic incentives to reduce greenhouse gas.

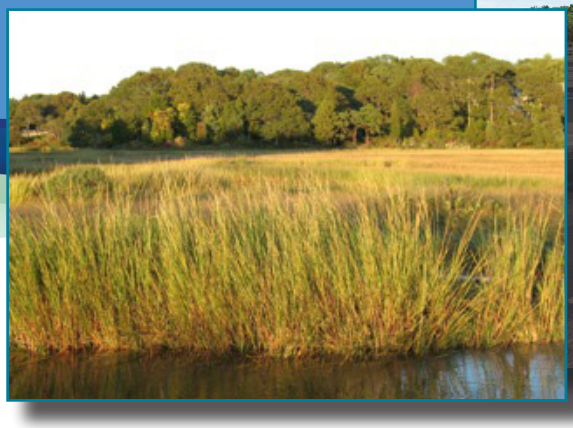
Anticipated tools include a carbon offset protocol and guidance for coastal wetland projects for use in Massachusetts and across the country, a model that developers, municipal officials, and nonprofits can use to estimate a project's potential to reduce greenhouse gas, and an analysis of the economic impact (positive or negative) of different wetland restoration and development scenarios.

Why this project?

Carbon dioxide, nitrous oxide, and methane are potent greenhouse gases that contribute to global warming by trapping heat in the atmosphere. While it is well known that forests store large amounts of carbon from greenhouse gases, research indicates that coastal wetlands might capture and store carbon at rates three to five times greater than forests. Research also suggests that nitrogen pollution from septic systems, stormwater runoff, and airborne pollution can significantly compromise a wetland's ability to store carbon. In extreme cases, wetlands may even become sources of greenhouse gas and contribute to climate change.

Bringing wetlands into carbon markets requires better understanding of the flux of carbon and greenhouse gas in coastal wetlands and the influence of nitrogen on that flux. If data from the three-year study bears this out, it will strengthen incentives for reducing the amount of nitrogen pollution flowing into coastal wetlands by creating market-based incentives for restoration.

Learn more on back...



(Left) Analysis of vegetation, soil elevation relative to sea level, salinity, and rate of nitrogen input are all factors likely to affect a wetland's annual carbon storage. (Right) Falmouth Wastewater Treatment Plant. If this project determines that nitrogen pollution impacts a salt marsh's ability to store carbon from greenhouse gases, carbon markets may provide an economic incentive to reduce nitrogen loading by helping to defray the costs of wastewater infrastructure.

About the funder

The NERRS Science Collaborative puts Reserve-based science to work for coastal communities coping with the impacts of land use change, stormwater, nonpoint source pollution, and habitat degradation in the context of a changing climate. Our threefold approach to connecting science to decision making includes:

- Funding: We award an average of $4 million annually to projects that incorporate collaboration and applied science to address a coastal management problem.
- Transfer of knowledge: We are committed to sharing the knowledge generated by the local, place-based research we fund. If you're interested in following this project, contact cindy.tufts@unh.edu.
- Graduate education: We sponsor two fellowships in TIDES, a Master's of Science program at the University of New Hampshire (UNH) that provides the skills needed to effectively link science to coastal decision making.

The program operates by a cooperative agreement between UNH and the National Oceanic and Atmospheric Administration.

Learn more at....
nerrs.noaa.gov/ScienceCollaborative.aspx

How will this project work?

This multidisciplinary team will explore the relationships between climate change, sea level rise, salt marshes and nitrogen pollution, with an emphasis on information gaps that block entry of wetland projects into carbon markets. They aim to develop and apply new techniques to quantify greenhouse gas emissions and carbon sequestration in wetlands and predict carbon fluxes across a range of environmental settings and under conditions of future climate change. Most fieldwork will take place at the Waquoit Bay NERR salt marsh in Mashpee, Massachusetts, a site that is being set up with infrastructure to measure sea level rise and its impact.

Data from the wetland science will inform development of a user-friendly model that municipalities, land trusts, and others can use to assess how many tons of carbon storage a development or restoration project might provide. The team also will conduct an economic analysis of the impact of nitrogen pollution on a salt marsh's ability to store carbon from greenhouse gases. If the effect is significant, carbon markets may provide an economic incentive for towns to reduce nitrogen pollution by helping to defray the costs of additional sewers, storm drains, and other expensive infrastructure.

The team will use the Collaborative Learning methodology to engage the input of stakeholders. Key questions for stakeholders include the following:

- What are the biggest needs and opportunities for wetlands restoration and/or conservation in Massachusetts?
- What specific challenges do you face in your work related to wetlands management and nitrogen loading?
- What can our project team to do to leverage this research so that it has the greatest impact possible in the conservation and coastal management community?
- How can we improve the decision support tools we plan to develop to increase their utility for you?
- Are there other key stakeholders that we should engage?
- Are you aware of other data, research, and efforts that we should know about and take into consideration?